Airline type and tourist expenditure: Are full service and low cost carriers converging or diverging?

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Abstract

Since some years ago low-cost carriers (LCCs) are becoming less and less low-cost-like, as well as full-service airlines are becoming less and less full-service-like, thus contributing to lessen the differences between users of one airline type and the other. LCCs have made air travel available to all budgets and enabled tourists to spend more at destination by reallocating their trip expenditure. The objective of this article is to observe if airline types have been converging regarding travellers' expenditure allocation and total trip expenditure. We use repeated cross sections of the Spanish tourist expenditure survey between 2006 and 2014, and *compositional data analysis with a total* in order not to confound effects involving expenditure allocation with those involving expenditure volume. Results show that users of both airline types converge in their allocation of the trip budget (between transportation and at-destination expenses, and within at-destination expenses), but diverge with regard to total trip expenditure.

Keywords: Compositional analysis (CoDa); Airline type convergence; Tourist spending; Hybrid business model; No-frills airlines; Low cost airline

1 Introduction

Some years ago nobody could have imagined that nowadays low cost carriers (LCCs) would be playing such a key role in the European travel industry. From 2004 to 2014 LCCs in Europe have gone through the stages of growth and maturity. LCC market share in intra-European Union routes was 47% in 2005, 54% in 2007, 60% in 2009, 58% in 2011 and 57% in 2013 (European Commission, 2015). LCCs have made air travel available to all budgets (Dobruszkes, 2013) and enabled tourists to spend more at destination by redistributing their trip budget (Martínez-Garcia and Raya, 2008). This has triggered the debate about the convenience of attracting these airlines to tourist destinations (Clavé et al., 2015; Laurino and Beria, 2014; Liasidou, 2013). Since the consolidation of LCCs, there has been a boom in the number of studies related to them, their demand, effects and impacts, as well as their relationships with airports and destinations, among others.

As airline users, we have noticed that since some years ago LCCs are becoming less low-cost-like, as well as legacy airlines, also known as full-service airlines, are becoming less legacy-like. That is, the two business models are converging (Daft and Albers, 2015). Legacy airlines are reducing prices to compete with LCCs; they are also starting not to offer food on board for free, for example. At the same time, LCCs are offering some services which, a priori, would not be included in their business model, such as ticket-flight flexibility. In short, they are both copying each other's business model. Thus, the differences between LCCs and legacy airlines are more and more blurry and tight, and, according to Jarach et al. (2009) and Lohmann and Koo (2013), a new hybrid business model merging the traits of LCCs and legacy airlines is emerging and even being consolidated.

Business model convergence could contribute to lessen the differences between users of one airline type and the other. Indeed, a substantial branch of research has focused on the differences between LCC and legacy-airline users (e.g. Chiou and Chen, 2010; Forgas et al., 2010), which are reportedly small. Ferrer-Rosell et al. (2014, 2015) found small differences between both airline type users when analysing the determinants of length of stay and expenditure allocation. By expenditure allocation we understand trip budget distribution among trip budget parts (transportation, accommodation, activities, food, shopping, and so on).

Interest of business scholars and managers lies not only in expenditure allocation but also in total expenditure volume. Ferrer-Rosell et al. (2016a), by means of a statistical analysis method named *compositional analysis with a total*, were able to determine which variables affect LCC users' trip budget distribution, their total trip expenditure or both. By using the same method, the objective of this article is to observe if there has been convergence between airline type users regarding tourist expenditure allocation and total expenditure. For this purpose we use repeated cross sections of inbound European tourists to Spain between 2006 and 2014. There are four possible answers to the

question:

- Convergence between airline types regarding both expenditure allocation and total trip budget.
- Convergence between airline types regarding expenditure allocation but not regarding total trip expenditure.
- Convergence between airline types regarding total trip expenditure but not regarding expenditure allocation.
- No convergence at all between airline types regarding expenditure.

The article is structured as follows. It first presents a literature review about airline type convergence. It next describes the compositional analysis approach with a total and the data used. It next provides the results of the analysis. The last section discusses and concludes.

2 Literature review

This literature review covers airline type differences and convergence from the perspective of both airline companies and traveller behaviour.

The transition from growth to maturity of LCCs in Europe from 2004 to 2014 has led to few differences between LCC and legacy airline users (Ferrer-Rosell et al., 2014). LCCs have been progressively capturing different traveller segments, even business travellers, and even more so during the economic crisis (Martínez-Garcia et al., 2012; Neal and Kassens-Noor, 2011).

Regarding the airlines themselves, it has been acknowledged that LCCs and legacy airlines are becoming more and more similar, and that even the differences between their business models and strategies are becoming blurry (Lohmann and Koo, 2013). There have been various studies analysing airline business model evolution from different perspectives and the conclusion is the same in all: the said business models are converging. This convergence was even forecasted before it actually occurred (Francis et al., 2006; Mason and Alamdari, 2007; Tsoukalas et al., 2008). Furthermore, de Wit and Zuidberg (2012) in their study about the growth limits of the LCC model concluded that there were signs of saturation in the market and forecasted a slowdown of LCC growth. In parallel, the new hybrid business model which merges the traits of LCC and legacy airlines (Franke and John, 2011) is already being consolidated (Jean and Lohmann, 2016).

The saturation of the LCC market and its limited growth forced LCCs to shift to business strategies traditionally used by full-service airlines, such as fare bundling, connecting flights and code sharing (Fageda et al., 2015; de Wit and Zuidberg, 2012). In terms of routes offered and airports used, Henrickson and Wilson (2016) and Dobruszkes et al., 2017found that LCC are increasing their operations in major airports and losing interest in operating in regional airports only. However, other studies found divergence between airline types, at least in some respects (e.g. employee productivity, homogeneous fleets, non-stop service, branding strategies and the use of tail fins; see Daraban, 2012; Taylor et al., 2013).

The blurriness between airline business models was confirmed by Jarach et al. (2009), Daft and Albers (2013) and Fageda et al. (2015) who concluded that the majority of LCCs were moving towards hybrid models. That is, the traditional split between LCCs and legacy airlines was challenged by mutation of both strategies towards the hybrid business model. Daft and Albers (2015) asserted that the ultra-low-cost model has become obsolete and Bachwich and Wittman (2016) analysed the differences between the ultra-low-cost and the low-cost models, and the latter, according to them, is closer to the full-service model.

Passengers of course react to airline strategies (Liasidou, 2013), and traveller behaviours by airline types are expected to somehow mirror airline strategies. However, to the best of our knowledge, all studies analysing passenger behaviour and reaction to airline strategies are static. Chiou and Chen (2010) found differences in the factors influencing intention to use one airline type or the other: legacy airline users are more influenced by service perception while LCC users are influenced by low-fare policy. Along similar lines, Rajaguru (2016) and Forgas et al. (2010) found that value for money affects customer satisfaction and loyalty in LCCs, while quality affects the same variables in full-service airlines. Mikulić and Prebežac (2011) also mentioned rewards within frequent-flyer programs as a loyalty factor for legacy airlines.

Along another line of research, Kuljanin and Kalić (2015) found differences in sociodemographic characteristics of passengers traveling to Serbia. Serbian citizens living abroad, passengers with up to secondary education, students, pensioners and unemployed tend to use LCCs. Coenders et al. (2016) found that LCC passengers use the Internet more often than legacy-airline users. However, Ferrer-Rosell et al. (2014) found overall similarity between LCC and legacy-airline users in length of stay at destination.

Regarding air passengers spending behaviour, some static studies have compared users of both airline types. For example, Eugenio-Martin and Inchausti-Sintes (2016) found that LCC users spend more at their destination compared to full-service-airline users. Ferrer-Rosell et al. (2015) found that passengers traveling to Spain behave similarly in terms of allocating their trip budget into expenditure components regardless of airline type. Finally, Ferrer-Rosell and Seetaram (2014) found that legacy-airline users spend more at destination, but only within certain income groups (medium self-reported income level). There is one study on air passenger's expenditure patterns using data

from more than one year (Ferrer-Rosell and Coenders, 2016) but it does not compare airline types. To the best of our knowledge, no scholarly article studies the convergence of airline types from the perspective of their users' spending behaviour.

3 Materials and method

3.1 Data and variables

We use official statistics micro data provided by the Instituto de Turismo de España (ITE) for 2006, 2008, 2010, 2012 and 2014. The ITE is an official agency which produces the data for the tourism satellite account in Spain and is now fully integrated in the National Statistics Institute. The main survey, known as the Encuesta de Gasto Turístico (EGATUR), follows a repeated cross-section design and gathers information on tourist expenditure on a per-person basis. The EGATUR survey has been conducted in 17–25 major Spanish airports depending on the year. The survey uses CAPI (Computer Assisted Personal Interview) to interview incoming tourists in the boarding area before taking the flight back home. The sample is non-proportionally stratified by country of residence, airport and month (ITE, 2014).

As in Ferrer-Rosell and Coenders (2016), the universe in this article is defined as European leisure visitors arriving by air and spending between one and 120 nights in Spain. Tourists whose expenditure allocation is unobserved (tourists who own a house at the destination or who stay with friends or relatives, package tourists, and tourists who do not pay by themselves) are excluded. The sample sizes are 11,647 (2006); 15,729 (2008); 18,293 (2010)(Please change the "," for ";" after (2010)), 19,142 (2012) and 19,508 (2014).

The budget parts included in the EGATUR survey are firstly, transportation (x_1). Secondly, accommodation and food are undistinguishable for full-board, half-board and bed-&-breakfast accommodation, we therefore merged them to define a joint accommodation-and-food component (x_2). This component includes consumption in bars and restaurants, as well as buying groceries and everyday products in supermarkets. Finally, EGATUR provides an aggregated expenditure for activities and shopping (except groceries and everyday products). To this, we added all conceptually similar expenses of moving around at the destination in order to build an activities-and-shopping component (x_3). x_2 and x_3 add up to at-destination expenditure.

3.2 Compositional analysis with a total

As regards our research question about the relative importance of expenditure allocated to each budget part, *Analysis of Compositional Data (CoDa)* is the standard method of statistical analysis when the researchers' interest lies in the relative size of parts of a whole, also referred to as components (Aitchison, 1986). Some recent references are Van den Boogaart and Tolosana-Delgado (2013), Pawlowsky-Glahn and Buccianti (2011), and Pawlowsky-Glahn et al. (2015a).

In expenditure allocation research, the relative importance of budget parts is the focus of interest and share of each part within the total budget (e.g. in %) is usually analysed. Although classical statistical methods have been used, for instance by Lee et al. (2015) and van Loon and Rouwendal (2017), CoDa solves their major statistical flaws related to the 0-100 boundary of percent share (Fry, 2011), and has been successfully applied both to family budgets (Fry et al., 1996) and to trip budgets (Ferrer-Rosell et al., 2015).

The most common CoDa approach is to express the data as logarithms of ratios among components or among their geometric means (Aitchison, 1986; Egozcue et al., 2003). Ratios, geometric means and logarithms constitute natural ways of distilling the information about relative size of components. As opposed to percent share, log ratios are unbounded and, once they have been computed, standard statistical analyses can be performed.

The usual way of computing log ratios are the so called *isometric log ratios* (ilr, Egozcue et al., 2003). Let $\mathbf{x}$ be the positive vector of D budget parts (components) in absolute terms:

$$\mathbf{x} = \left(x_1,\ x_2,\ \ldots,\ x_D\right), \text{with} x_j > 0 for all j = 1, 2, \ldots, D, \quad \mathbf{x} = \left(x_1,\ x_2,\ \ldots,\ x_D\right),\ \text{with}\ x_j > 0\ for\ all\ j = 1, 2, \ldots, D, \tag{1}$$

((In Equation 1 the words "for all" must not be in italics. And in pagination pdf the Equation 1 is not well presented. We suggest to put the "with..., D," part below the "x= (x1, ... xD)" part.)1)

Ilr can be easily formed from a *sequential binary partition*. This consists in selecting which parts contribute to the log ratio and deciding if these will appear in the numerator or in the denominator. To create the first ilr, the complete composition is split into two groups of parts: one for the numerator and the other for the denominator. In the following step, one of the two groups is further split into two new groups to create the second ilr. In step k when the y_k ilr is created, a group containing r_k+s_k parts is split into two: r_k parts ($x_{n1},\ldots, x_{nr}$) are placed in the numerator, and s_k parts ($x_{d1},\ldots,x_{ds}$) in the denominator. Ilr include a normalising constant and compare the geometric means of each group of parts (Egozcue et al., 2003):

$$y_k = \sqrt{\frac{r_k s_k}{r_k + s_k}} \ln \frac{\left(x_{n1} \cdots x_{nr}\right)^{1/r_k}}{\left(x_{d1} \cdots x_{ds}\right)^{1/s_k}}, \tag{2}$$

where $\sqrt{\frac{r_k s_k}{r_k+s_k}}$ is the normalising constant.

Each possible sequential binary partition leads to a different set of ilr, which have to be interpreted with respect to the chosen partition. A positive relation of the ilr with an external dependent variable implies that increases in the group of parts in the numerator (or decreases in the group of parts in the denominator) tend to occur together with increases in the external variable. Parts can be partitioned in such a way that the relationships between the ilr and external variables are connected to hypotheses or questions of interest to the researcher.

Sequential binary partitions are best understood with a dendrogram (Pawlowsky-Glahn and Egozcue, 2011). The dendrogram (Fig. 1) we use draws from Ferrer-Rosell et al. (2016b):

- The first ilr shows how tourists distribute total expenditure between transportation and at-destination expenditure.
- The second ilr shows how tourists distribute at-destination expenditure into accommodation and food versus activities and shopping.

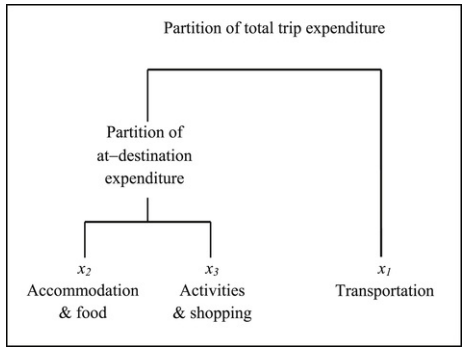

Fig. 1 Sequential binary partition of trip budget parts.

alt-text: Fig. 1

The implied ilr are:

$$y_1 = \sqrt{\frac{2}{3}} ln \left(\frac{x_1}{\sqrt{x_2 x_3}} \right)$$
$$y_2 = \sqrt{\frac{1}{2}} ln \left(\frac{x_2}{x_3} \right) \quad \textbf{(3)}$$

As it is well known, log ratio transformations imply that **x** may contain no zero values. If the **x** vector contains zeros, they have to be replaced prior to computing the log ratios. This issue is outside the scope of the article. For a general reference see Martín-Fernández et al. (2011). We follow the same procedure as Ferrer-Rosell et al. (2016a).

Since our research question outlined in the introduction concerns not only expenditure distribution but also total expenditure, absolute information on expenditure volume needs to be included in the analysis. The so-called *CoDa with a total* enables researchers to analyse the relative and absolute size of budget parts together in the same statistical model, while not confounding effects involving the relative importance and effects involving absolute importance (Coenders et al., 2017; Ferrer-Rosell et al., 2016a; Pawlowsky-Glahn et al., 2015b). The approach boils down to adding some form of total to the ilr. Pawlowsky-Glahn et al. (2015b) suggest adding a total t computed as $\sqrt{D}$ times the logarithm of the geometric mean of all absolute values per parts:

$$t = \sqrt{D} \ln \left(\sqrt[D]{x_1 x_2 \cdots x_D} \right) \quad t = \sqrt{D} \ln \left(\sqrt[D]{x_1 x_2 \cdots x_D} \right). \quad \textbf{(4)}$$

Coefficients in a statistical model relating the ilr to an explanatory variable refer to the manner in which the explanatory variable predicts the distribution of the total among parts. Coefficients related to t refer to the manner in which the variable predicts total volume.

Ilr and the total can be jointly related to the set of explanatory variables by means of simultaneous regression models (Fišerová et al., 2016) or multivariate analysis of variance/covariance models (Ferrer-Rosell et al., 2016a; Martín-Fernández et al., 2015) with identical results. Both approaches can be implemented with standard methods (e.g. ordinary least squares) and software.

As explanatory variables, our multivariate analysis of variance model includes the main effects of year (2006, 2008, 2010, 2012, 2014) and airline type (LCC, legacy), and their interaction. If significant, the latter shows

convergence or divergence of airline types along time, regarding absolute expenditure, expenditure distribution among trip budget parts, or both.

As control variables we use those listed in Table 1. Table 2 shows the distribution of airline type per year, and Table 3 shows descriptive statistics for absolute expenditure per parts, ilr and total.

Table 1 Distribution of control variables (%).

alt-text: Table 1

Variable	Variable category	
Travel group	Traveling alone	13.3
	Traveling in family	17.6
	Traveling with friends	20.4
	Traveling with partner[a]	48.6
Country of residence	Austria, Swiz, Liech.	4.5
	Other European countries	6.0
	France	7.8
	Scandinavia	8.7
	Benelux	10.7
	Italy	13.5
	Germany	13.7
	UK and Ireland[a]	35.1
Education	Up to high school education[a]	34.3
	University education	65.7
Reported income category	Low income category	3.6
	High income category	26.9
	Medium income category[a]	69.6
Repeat visitor	Repeat visitor	22.8
	First-time visitor[a]	77.2
Gender	Female	44.6
	Male[a]	55.4
Age	Over 45 pensioner	7.4
	15-24 years old	10.3
	Over 45 not pensioner	29.5
	25-44 years old[a]	52.9
Professional status	Homemaker	2.6

	Unemployed	2.4
	Low-level employee	4.6
	Student	5.8
	High-level employee	10.8
	Self employed	13.3
	Mid-level employee[a]	60.3
	Missing	0.3

[a] Reference category in the multivariate analysis of variance model.

Table 2 Distribution of airline type per year (%).

alt-text: Table 2

	2006	2008	2010	2012	2014
Legacy	48.3	32.4	29.5	24.5	24.2
LCC	51.7	67.6	70.5	75.5	75.8

Table 3 Descriptive statistics for absolute expenditure per parts (EUR), ilr (Eq. (3)), and total (Eq. (4)).

alt-text: Table 3

	Min	Max	Mean	S.D.
x_1	0.01	5102.04	204.48	135.15
x_2	0.50	19100.00	477.62	455.48
x_3	0.00	10051.00	159.32	209.30
y_1	−7.43	4.48	−0.03	0.74
y_2	−3.75	6.58	1.03	1.01
t	1.76	14.57	8.97	1.11

4 Results

The interaction between airline type and year is significant for both log ratios and for the total variable (Table 4). This means that the differences in expenditure allocation and in expenditure volume between legacy airlines and LCCs evolve along time, which may correspond to convergence, divergence or even to a more complex pattern. Table 5 shows the intercepts in the multivariate analysis of variance equations for each combination of airline type and year, and the differences in intercepts between airline types for each year (a positive difference means a higher ilr or a higher total for legacy airlines). The intercepts are the predicted values for the reference categories of the control variables, which represent a very frequent traveller profile (traveling with partner, residing in the UK and Ireland, with up to high school education, medium income, first-time visitor, male, 25 to 44 years old, and mid-level employee). The intercept differences between airline types hold for any traveller profile.

Table 4 Significance tests in the multivariate analysis of variance model.

alt-text: Table 4

Explanatory variable	Dependent variable	d.f.	F statistic	p-value (Could the content of the p-value column be justified at right?)
Year	y_1	4	276.4	<0.001
	y_2	4	443.7	<0.001
	t	4	492.6	<0.001
Airline type	y_1	1	505.3	<0.001
	y_2	1	11.3	0.001
	t	1	1289.2	<0.001
Interaction year × airline type	y_1	4	30.8	<0.001
	y_2	4	20.6	<0.001
	t	4	10.2	<0.001
Travel group	y_1	3	208.9	<0.001
	y_2	3	323.7	<0.001
	t	3	261.0	<0.001
Country of residence	y_1	7	65.1	<0.001
	y_2	7	200.0	<0.001
	t	7	351.61	<0.001
Education	y_1	1	129.6	<0.001
	y_2	1	415.4	<0.001
	t	1	0.0	0.977
Reported income category	y_1	2	122.2	<0.001
	y_2	2	5.6	0.004
	t	2	506.3	<0.001
Repeat visitor	y_1	1	2.6	0.104
	y_2	1	41.1	<0.001
	t	1	110.5	<0.001
Gender	y_1	1	32.9	<0.001
	y_2	1	13.0	<0.001
	t	1	22.2	<0.001
Age	y_1	3	23.6	<0.001
	y_2	3	193.7	<0.001
	t	3	79.1	<0.001
	y_1	6	11.1	<0.001

Professional status	y_2	6	16.7	<0.001
	t	6	75.1	<0.001

Table 5 Intercept terms in the equations for each combination of airline type and year.

alt-text: Table 5

Ilr transport(This Table heading might be located in a row above the row: 2006: 0.23, 0.01, 0.21, as the other "Ilr... (y2)" and "Total expenditure (t)" are. And the headings of the three columns "Legacy", "LCC" and "Difference" must be the first row of the Table 5. Any doubt regarding that, please let us know. We include a document with the corrected table as it has to be.)ation/at-destination (y_1)			
	Legacy	LCC	Difference
2006	0.23	0.01	0.21
2008	0.21	0.00	0.20
2010	0.33	0.27	0.06
2012	0.14	0.05	0.09
2014	0.09	−0.01	0.10
Ilr accommodation/activities (y_2)			
2006	1.32	1.22	0.10
2008	1.32	1.21	0.10
2010	1.58	1.65	−0.07
2012	1.34	1.33	0.01
2014	1.17	1.18	−0.01
Total expenditure (t)			
2006	8.99	8.76	0.23
2008	8.97	8.70	0.28
2010	8.61	8.31	0.30
2012	8.90	8.52	0.38
2014	9.11	8.78	0.33

An overall look at Table 5 tells that airline types converge when it has to do with distribution of the trip budget (between transportation and at-destination expenses, and within at-destination expenses), but diverge with regard to total trip expenditure.

Regarding the distribution between transportation and at-destination expenses, the difference between airline types has been decreasing, probably as a result of the airline business model convergence. The difference in 2006 was larger than in 2014 (0.21 vs 0.10), meaning that legacy airline users started by spending quite more on transportation, compared to at-destination expenses, than LCC users.In 2014 they still spent comparatively more than LCC users but the difference was tighter. The most drastic change, showing the convergent tendency was between 2008 and 2010, year in which we find the smallest difference between both airline types (0.06).

Convergence between airline types is clearest when it comes to the distribution of trip budget within at-destination expenses. The difference between airline types has been closing, and in 2012 and 2014 there is virtually no difference in how legacy airline users and LCC users distribute their trip budget between accommodation and activities. The most drastic change was also between 2008 and 2010, and in 2010 the difference between users of both

airline types was even reversed (LCC users spent comparatively more on accommodation than legacy airline users). Admittedly tourist behaviour at destination has little to do with airline business models; in any case, both airline types seem more and more to attract users who spend similarly at destination.

Regarding total trip budget, results show that there is no convergence at all, but it is actually the other way round: the difference between airline type users increased during the period analysed. In 2006 legacy airline users were already spending more in absolute terms compared to LCC users, and ITE, 2014 the difference between both airline type users was even larger. The largest difference in terms of total trip expenditure was in 2012.

5 Discussion and conclusion

In the last decade, the European airline sector has been obliged to change and adapt strategy to compete against the force represented by LCC, and the industry has eventually seen itself moving towards some form of halfway hybridism. Airline convergence has not yet been analysed from the passenger's perspective in order to find out how passengers' behaviour changes mirroring airlines' strategies. The objective of this article is to observe if airline types have been converging regarding travellers' expenditure allocation and their total trip expenditure. Thus, we contribute to discovering airline users' convergence, or divergence, more than observing convergence of the airlines themselves. For airline companies, knowing which passenger profile they serve is a key aspect in terms of planning routes, offering services on board and other ancillary services, using regional or hub airports, and establishing loyalty programs, among others. From the demand point of view, we analyse one of the main decisions (or restrictions) when traveling, the trip budget. Results show that travellers using legacy airlines have a higher trip budget, but when it comes to distribute it at destination, both airline type users behave similarly and spend a similar proportion of their at-destination budget on undertaking activities.

Regarding the four possible answers to the question outlined in the introduction, we have found convergence between airline types regarding expenditure allocation (share), but not regarding total trip expenditure (volume). As of 2014, travellers of both airline types behave the most similarly when it has to do with the distribution of at-destination expenses. Along time, the users of both airline types have tended to reduce the share allocated to accommodation and increase the share allocated to activities and the small differences existing at the start of the study period have vanished at the end. LCC users are thus becoming more active tourists, in accordance with the findings by Ferrer-Rosell and Coenders (2016) who identified a growing active tourism segment flying by LCC.

In terms of distributing the trip budget between transportation and at-destination expenditure, budget share allocated to transportation has become more and more similar between 2006 and 2014, although admittedly legacy airline users continue to devote a somewhat greater share to transportation. The convergence of the LCC business model towards the legacy model thus seems to have contributed to a partial convergence in this important aspect of tourist behaviour. This is seemingly bad news for the legacy sector, whose airfares are capturing a lower and lower share of tourists' total expenditure.

Is not surprising to find convergence in the transportation/at-destination expenditure balance, because of its relationship with airfares. Airfare convergence has been strengthened by some LCCs (e.g. Ryanair) moving to larger more central airports, thus tightening the competition felt by legacy carriers, which have reacted by reducing the air fares for the lower-end of the cabin. Indeed, purchase decision in the short-haul market is mainly driven by value for money. Furthermore, empirical evidence shows that air passengers pay higher fares at congested airports, thus suggesting that LCCs benefit from price increases in a scenario where supply is not able to match demand (SEO, 2017).

Regarding total trip budget, we have found that airline type users behave more and more differently. Legacy airline travellers spend more overall and the gap with respect to LCC travellers has widened during the analysed period. Seemingly legacy airlines are progressively capturing more of the high budget traveller segment. That is, there still are a relatively significant number of passengers that value a personalised service and loyalty, who would pay extra for flying with a legacy airline. In this respect, the convergence of the LCC business model towards the legacy model does not seem to have contributed to LCCs attracting higher budget travellers. These travellers still fly with legacy airlines and would be the same who spend more at destination.

In all three studied variables, 2010 acts as a turning point related to the financial crisis, which had its harshest effects on the economies of most EU countries —the most important outbound markets to Spain — between 2009 and 2010. According to Bronner and de Hoog (2016) crises more often than not imply cutting back on certain expenditure components by modifying certain trip attributes, by shortening length of stay or by using cheaper accommodation or transportation. Value for money when purchasing a flight ticket is a key aspect of that. Such saving behaviours change both expenditure allocation and total trip budget (Ferrer-Rosell and Coenders, 2016). Time will tell if some of the deep changes in tourism expenditure patterns after the crisis will remain structural. In as far as our data are concerned, they have persisted over at least five years.

In terms of method used, since interest lies in distinguishing between the relative importance of budget parts and total trip expenditure in the same statistical model, CoDa with a total is an appropriate approach. An additional appeal of CoDa with a total for studying tourism expenditure and trip budgets lies in the fact that, once the variables have been transformed into log ratios and total, the researcher can use standard and well understood statistical models. The method offers the potential to construct tailor-made log ratios which are intuitive to interpret and suit one's own research questions. A dendrogram is a clear and useful graphical tool in this respect.

Although this study's findings provide information about how airline type convergence can be translated into tourist spending behaviour and how both airline type users have converged, they are of course limited by the available variables in the EGATUR survey. Not all control variables usually employed in expenditure studies are available in the EGATUR questionnaire. Further research on the passengers' expenditure decisions relevant to the air

transportation industry (e.g. booking time, evolution of air fares, loyalty programs, destinations offered or airports used) is needed, as well as research about profiling each type of airline users and elucidating which is the most interesting to destinations. Besides, convergence of airline passengers by airline type can also be assessed with respect to other traveller and trip characteristics, such as age (have LCC passengers traditionally been younger?), income (have LCC passengers traditionally had lower income?) or trip motivation (have LCC passengers traditionally flown for visiting friends and relatives?).

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Highlights

- Airline type convergence from another perspective.
- Study of airline passengers spending behavior in repeated cross sections.
- Convergence in passengers' trip budget distribution.
- Divergence in passengers' total trip expenditure.
- Compositional data analysis with a total to tell distribution from total.

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